WHAT IS CLAIMED IS:

1.   A data transmitting node connected with a physical
network, comprising:

5   a first transmission unit for transmitting a control
message in a case of transmitting information data to a
receiving node through connected with the physical network
or another physical network, the control message including
an IP address information of a data transmission

10   destination, a header/channel information dependent on the
physical network, and an information indicating that the
information data to be transmitted according to the
header/channel information is data in an upper layer of an
IP layer; and

15   a second transmission unit for transmitting the
information data to the receiving node, the information
data containing the header/channel information and data of
the upper layer without IP packet encapsulation.

20   2.   The data transmitting node of claim 1, wherein the
control message commands to a network inter-connection node
for connecting said physical network and a next physical
network a registration of a correspondence between the
header/channel information dependent on said physical

25   network and a header/channel information dependent on the
next physical network.

3.   The data transmitting node of claim 1, further
comprising:

30   a reception unit for receiving digital video and/or
digital audio data;
        wherein the second transmission unit transmits the
digital video and/or digital audio data received by the
reception unit as the information data, by formatting the

35   digital video and/or digital audio data into a transmission

format for said physical network.

4.   A network inter-connection node for transmitting information data received from one physical network to
5   another physical network, comprising:
       a reception unit for receiving a first control message from said one physical network, the first control message containing an IP address information of a data transmission destination, a first header/channel information dependent
10 on said one physical network, and an information indicating that an information data to be transmitted according to the first header/channel information is data in an upper layer of a protocol layer corresponding to the IP address information;
15   a first transmission unit for transmitting a second control message to said another physical network when the reception unit receives the first control message, the second control message containing the IP address information, a second header/channel information dependent
20 on said another physical network which is obtained from the IP address information, and the information indicating that the information data to be transmitted according to the second header/channel information is data in the upper layer;
25   a memory unit for storing a correspondence between the first header/channel information and the second header/channel information; and
       a second transmission unit for obtaining the second header/channel information corresponding to the first
30 header/channel information according to the correspondence stored in the memory unit when the information data containing the first header/channel information is received from said one physical network, attaching the second header/channel information to the information data, and
35 transmitting the information data to said another physical

network, the information data containing data of the upper layer without IP packet encapsulation.

5.   The network inter-connection node of claim 4, wherein the first control message commands a registration of a correspondence between the first header/channel information and the second header/channel information, and

the second control message commands to a receiving node or a network inter-connection node for connecting said another physical network and a third physical network a registration of a correspondence between the second header/channel information and a header/channel information dependent on said third physical network.

6.   A data transmitting node connected with a physical network, comprising:

a first transmission unit for transmitting a control message in a case of transmitting information data to a receiving node connected with the physical network or another physical network, the control message including an IP address information of a data transmission destination, a header/channel information dependent on the physical network, and an information indicating a required communication resource; and

a second transmission unit for transmitting the information data containing the header/channel information for which the required communication resource is reserved, to the receiving node.

7.   The data transmitting node of claim 6, wherein the control message commands to a network inter-connection node for connecting said physical network and a next physical network a registration of a correspondence between the header/channel information dependent on said physical network and a header/channel information dependent on the

next physical network for which the required communication
resource is reserved.

8.   The data transmitting node of claim 6, further
comprising:
        a reception unit for receiving digital video and/or
digital audio data;
        wherein the second transmission unit transmits the
digital video and/or digital audio data received by the
reception unit as the information data, by formatting the
digital video and/or digital audio data into a transmission
format for said physical network.

9.   A network inter-connection node for transmitting
information data received from one physical network to
another physical network, comprising:
        a reception unit for receiving a first control message
from said one physical network, the first control message
containing an IP address information of a data transmission
destination, a first header/channel information dependent
on said one physical network, and an information indicating
a required communication resource;
        a first transmission unit for transmitting a second
control message to said another physical network when the
reception unit receives the first control message, the
second control message containing a second header/channel
information dependent on said another physical network
which is obtained from the IP address information, and the
information indicating the required communication resource;
        an establishing unit for establishing a communication
path with respect to a receiving node or a next network
inter-connection node for connecting said another physical
network and a third physical network, the communication
path having the second header/channel information with the
required communication resource;

a memory unit for storing a correspondence between the first header/channel information and the second header/channel information; and

a second transmission unit for obtaining the second header/channel information corresponding to the first header/channel information according to the correspondence stored in the memory unit when the information data containing the first header/channel information is received from said one physical network, attaching the second header/channel information to the information data, and transmitting the information data to said another physical network.

10. The network inter-connection node of claim 9, wherein the first control message commands a registration of a correspondence between the first header/channel information and the second header/channel information, and

the second control message commands to the receiving node or the next network inter-connection node a registration of a correspondence between the second header/channel information and a header/channel information dependent on said third physical network.

11. A data transmitting node connected with a physical network, comprising:

a first transmission unit for transmitting a control message in a case of transmitting information data to a receiving node connected with the physical network or another physical network, the control message including an IP address information of a data transmission destination, a header/channel information dependent on the physical network, and an information on a format of the information data to be transmitted according to the header/channel information; and

a second transmission unit for transmitting the

information data in said format which contains the header/channel information, to the receiving node.

12. The data transmitting node of claim 11, wherein the control message commands to a network inter-connection node for connecting said physical network and a next physical network a registration of a correspondence between the header/channel information dependent on said physical network and the header/channel information dependent on the next physical network.

13. The data transmitting node of claim 11, further comprising:

a reception unit for receiving digital video and/or digital audio data;

wherein the second transmission unit transmits the digital video and/or digital audio data received by the reception unit as the information data, by formatting the digital video and/or digital audio data into said format.

14. A network inter-connection node for transmitting information data received from one physical network to another physical network, comprising:

a reception unit for receiving a first control message from said one physical network, the first control message containing an address information of a data transmission destination, a first header/channel information dependent on said one physical network, and an information on a format of the information data to be transmitted according to the first header/channel information;

a first transmission unit for transmitting a second control message to said another physical network when the reception unit receives the first control message, the second control message containing the address information, a second header/channel information dependent on said

another physical network which is obtained from the address information, and the information on a format of the information data to be transmitted according to the second header/channel information;

5   a memory unit for storing a correspondence between the first header/channel information and the second header/channel information;

a conversion unit for converting a transmission format of the information data to be transmitted from a

10 transmission format in the said one physical network to a transmission format in said another physical network; and

a second transmission unit for obtaining the second header/channel information corresponding to the first header/channel information according to the correspondence

15 stored in the memory unit when the information data containing the first header/channel information is received from said one physical network, attaching the second header/channel information to the information data, and transmitting the information data to said another physical

20 network.

15.   The network inter-connection node of claim 14, wherein the first control message commands a registration of a correspondence between the first header/channel information

25 and the second header/channel information, and

the second control message commands to a receiving node or a network inter-connection node for connecting said another physical network and a third physical network a registration of a correspondence between the second

30 header/channel information and a header/channel information dependent on said third physical network.

16.   The network inter-connection node of claim 14, wherein the information data to be transmitted by the second

35 transmission unit is MPEG data, and the conversion unit

converts the transmission format of the MPEG data from a transmission format for the MPEG data in said one physical network to a transmission format for the MPEG data in said another physical network.

5

17.   A data transmitting node connected with an IEEE 1394 bus, comprising:

a first transmission unit for transmitting a control message in a case of transmitting information data to a

10   receiving node connected with another physical network, the control message including an address information of a data transmission destination, and an isochronous channel number or a register offset indicating an isochronous channel of said IEEE 1394 bus; and

15   a second transmission unit for transmitting the information data in forms of IEEE 1394 packets containing the isochronous channel number or the register offset, onto the isochronous channel.

20   18.   The data transmitting node of claim 17, wherein the control message commands to a network inter-connection node for connecting said IEEE 1394 bus and a next physical network a registration of a correspondence between the isochronous channel number ot the register offset and a

25   header/channel information dependent on the next physical network.

19.   The data transmitting node of claim 17, further comprising:

30   a reception unit for receiving digital video and/or digital audio data;

wherein the second transmission unit transmits the digital video and/or digital audio data received by the reception unit as the information data, by formatting the

35   digital video and/or digital audio data into an IEEE 1394

transmission format.

20.   A network inter-connection node for connecting at
least two physical networks including an IEEE 1394 bus and
5 transmitting an information data received from one physical
network to another physical network, comprising:
    a reception unit for receiving a first control message
from said one physical network, the first control message
containing an address information of a data transmission
10 destination, and a first header/channel information
dependent on said one physical network;
    a first transmission unit for transmitting a second
control message to said another physical network when the
reception unit receives the first control message, the
15 second control message containing the address information
and a second header/channel information dependent on said
another physical network which is obtained from the address
information;
    a memory unit for storing a correspondence between the
20 first header/channel information and the second
header/channel information, at least one of the first
header/channel information and the second header/channel
information including an isochronous channel number or a
register offset indicating an isochronous channel of the
25 IEEE 1394 bus; and
    a second transmission unit for obtaining the second
header/channel information corresponding to the first
header/channel information according to the correspondence
stored in the memory unit when the information data
30 containing the first header/channel information is received
from said one physical network, attaching the second
header/channel information to the information data, and
transmitting the information data to said another physical
network.

35

21. The network inter-connection node of claim 20, wherein said another physical network is an Ethernet or a token ring or a FDDI, and the second header/channel information indicates a MAC address.

5

22. The network inter-connection node of claim 20, wherein said one physical network is an Ethernet or a token ring or a FDDI, and the first header/channel information indicates a MAC address.

10

23. The network inter-connection node of claim 20, wherein said another physical network is an ATM network, and the second header/channel information indicates a VPI/VCI.

15   24. The network inter-connection node of claim 20, wherein said one physical network is an ATM network, and the first header/channel information indicates a VPI/VCI.

25. A data transmitting node connected with a network,
20   comprising:
        a first transmission unit for transmitting a control message in a case of transmitting information data to a receiving node connected with another network, the control message including a first MAC address information of a data
25   transmission destination, and a second MAC address information to be attached to the information data; and
        a second transmission unit for transmitting the information data containing the second MAC address information, to the receiving node.

30

26. The data transmitting node of claim 25, wherein the control message commands to a network inter-connection node for connecting said network and a next network a registration of a correspondence between the second MAC
35   address information and a header/channel information

dependent on the next network.

27.   The data transmitting node of claim 25, further
comprising:
5   a reception unit for receiving digital video and/or
digital audio data;
        wherein the second transmission unit transmits the
digital video and/or digital audio data received by the
reception unit as the information data, by formatting the
10 digital video and/or digital audio data into a transmission
format for said network.

28.   A network inter-connection node for transmitting
information data received from one network to another
15 network, comprising:
        a reception unit for receiving a first control message
from said one network, the first control message containing
a first MAC address information of a data transmission
destination, and a second MAC address information;
20   a first transmission unit for transmitting a second
control message to said another network when the reception
unit receives the first control message, the second control
message containing the first MAC address information, and a
third MAC address information which is obtained from the
25 first MAC address information;
        a memory unit for storing a correspondence between the
second MAC address information and the third MAC address
information; and
        a second transmission unit for obtaining the third MAC
30 address information corresponding to the second MAC address
information according to the correspondence stored in the
memory unit when the information data containing the second
MAC address information is received from said one network,
attaching the third MAC address information to the
35 information data, and transmitting the information data to

said another network.

29. A network inter-connection node for connecting
at least two physical networks, comprising:
     a request receiving unit for receiving from a first
physical network an address resolution request for
resolving a datalink layer address from a network layer
address;
     a forwarding unit for forwarding the address
resolution request with respect to a connected physical
network other than the first physical network;
     a response receiving unit for receiving from a second
physical network a first address resolution response
corresponding to the address resolution request forwarded
by the forwarding unit;
     a registration unit for registering a correspondence
between the network layer address and the second physical
network into a routing table, by referring to a network
layer source address or a network address contained in the
first address resolution response; and
     a response transmitting unit for transmitting to the
first physical network a second address resolution response
corresponding to the address resolution request received by
the request receiving unit, by inserting a datalink layer
address of said network inter-connection node device as a
resolved address.

30. The network inter-connection node device of claim 29,
further comprising:
     a transfer unit for transferring a received packet to
a physical network registered in the routing table,
according to a network layer destination address of the
received packet.

31. The network inter-connection node device of claim 29,

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wherein the response transmitting unit activates the forwarding unit when a network layer address contained in the address resolution request received from the first physical network is not a network layer address of said

5   network inter-connection node device and not registered in the routing table, and transmits the second address resolution response otherwise.

    32.   The network inter-connection node device of claim 29,

10   wherein the first physical network and the second physical network are operated by different datalink protocols.

    33.   A method of data transmission at a data transmitting node connected with a physical network, comprising the

15   steps of:
    (a) transmitting a control message in a case of transmitting information data to a receiving node connected with the physical network or another physical network, the control message including an IP address information of a

20   data transmission destination, a header/channel information dependent on the physical network, and an information indicating that the information data to be transmitted according to the header/channel information is data in an upper layer of an IP layer; and

25   (b) transmitting the information data to the receiving node, the information data containing the header/channel information and data of the upper without IP packet encapsulation.

30   34.   The method of claim 33, wherein the control message commands to a network inter-connection node for connecting said physical network and a next physical network a registration of a correspondence between the header/channel information dependent on said physical network and a

35   header/channel information dependent on the next physical

network.

35. The method of claim 33, further comprising the step
of:
5   (c) receiving digital video and/or digital audio data;
         wherein the step (b) transmits the digital video
and/or digital audio data received by the step (c) as the
information data, by formatting the digital video and/or
digital audio data into a transmission format for said
10 physical network.

36. A method of data transmission at a network inter-
connection node for transmitting information data received
from one physical network to another physical network,
15 comprising the steps of:
    (a) receiving a first control message from said one
physical network, the first control message containing an
IP address information of a data transmission destination,
a first header/channel information dependent on said one
20 physical network, and an information indicating that an
information data to be transmitted according to the first
header/channel information is data in an upper layer of a
protocol layer corresponding to the IP address information;
    (b) transmitting a second control message to said another
25 physical network when the step (a) receives the first
control message, the second control message containing the
IP address information, a second header/channel information
dependent on said another physical network which is
obtained from the IP address information, and the
30 information indicating that the information data to be
transmitted according to the second header/channel
information is data in the upper layer;
    (c) storing a correspondence between the first
header/channel information and the second header/channel
35 information; and

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(d) obtaining the second header/channel information corresponding to the first header/channel information according to the correspondence stored by the step (c) when the information data containing the first header/channel

5 information is received from said one physical network, attaching the second header/channel information to the information data, and transmitting the information data to said another physical network, the information data containing data of the upper layer without IP packet

10 encapsulation.

37. The method of claim 36, wherein the first control message commands a registration of a correspondence between the first header/channel information and the second

15 header/channel information, and
the second control message commands to a receiving node or a network inter-connection node for connecting said another physical network and a third physical network a registration of a correspondence between the second

20 header/channel information and a header/channel information dependent on said third physical network.

38. A method of data transmission at a data transmitting node connected with a physical network, comprising the

25 steps of:
(a) transmitting a control message in a case of transmitting information data to a receiving node connected with the physical network or another physical network, the control message including an IP address information of a

30 data transmission destination, a header/channel information dependent on the physical network, and an information indicating a required communication resource; and
(b) transmitting the information data containing the header/channel information for which the required

35 communication resource is reserved, to the receiving node.

39. The method of claim 38, wherein the control message commands to a network inter-connection node for connecting said physical network and a next physical network a

5 registration of a correspondence between the header/channel information dependent on said physical network and a header/channel information dependent on the next physical network for which the required communication resource is reserved.

10

40. The method of claim 38, further comprising the step of:
    (c) receiving digital video and/or digital audio data;
        wherein the step (b) transmits the digital video

15 and/or digital audio data received by the step (c) as the information data, by formatting the digital video and/or digital audio data into a transmission format for said physical network.

20 41. A method of data transmission at a network inter-connection node for transmitting information data received from one physical network to another physical network, comprising the steps of:
    (a) receiving a first control message from said one

25 physical network, the first control message containing an IP address information of a data transmission destination, a first header/channel information dependent on said one physical network, and an information indicating a required communication resource;

30   (b) transmitting a second control message to said another physical network when the step (a) receives the first control message, the second control message containing a second header/channel information dependent on said another physical network which is obtained from the IP address

35 information, and the information indicating the required

communication resource;

(c) establishing a communication path with respect to a
receiving node or a next network inter-connection node for
connecting said another physical network and a third
physical network, the communication path having the second
header/channel information with the required communication
resource;

(d) storing a correspondence between the first
header/channel information and the second header/channel
information; and

(e) obtaining the second header/channel information
corresponding to the first header/channel information
according to the correspondence stored by the step (d) when
the information data containing the first header/channel
information is received from said one physical network,
attaching the second header/channel information to the
information data, and transmitting the information data to
said another physical network.

42. The method of claim 41, wherein the first control
message commands a registration of a correspondence between
the first header/channel information and the second
header/channel information, and

the second control message commands to the receiving
node or the next network inter-connection node a
registration of a correspondence between the second
header/channel information and a header/channel information
dependent on said third physical network.

43. A method of data transmission at a data transmitting
node connected with a physical network, comprising the
steps of:

(a) transmitting a control message in a case of
transmitting information data to a receiving node connected
with the physical network or another physical network, the

control message including an IP address information of a data transmission destination, a header/channel information dependent on the physical network, and an information on a format of the information data to be transmitted according
5 to the header/channel information; and

   (b) transmitting the information data in said format which contains the header/channel information, to the receiving node.

10 44.   The method of claim 43, wherein the control message commands to a network inter-connection node for connecting said physical network and a next physical network a registration of a correspondence between the header/channel information dependent on said physical network and the
15 header/channel information dependent on the next physical network.

   45.   The method of claim 43, further comprising the step of:
20   (c) receiving digital video and/or digital audio data;
      wherein the step (b) transmits the digital video and/or digital audio data received by the step (c) as the information data, by formatting the digital video and/or digital audio data into said format.
25

   46.   A method of data transmission at a network inter-connection node for transmitting information data received from one physical network to another physical network, comprising the steps of:
30   (a) receiving a first control message from said one physical network, the first control message containing an address information of a data transmission destination, a first header/channel information dependent on said one physical network, and an information on a format of the
35 information data to be transmitted according to the first

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header/channel information;

(b) transmitting a second control message to said another physical network when the step (a) receives the first control message, the second control message containing the address information, a second header/channel information dependent on said another physical network which is obtained from the address information, and the information on a format of the information data to be transmitted according to the second header/channel information;

(c) storing a correspondence between the first header/channel information and the second header/channel information;

(d) converting a transmission format of the information data to be transmitted from a transmission format in the said one physical network to a transmission format in said another physical network; and

(e) obtaining the second header/channel information corresponding to the first header/channel information according to the correspondence stored by the step (c) when the information data containing the first header/channel information is received from said one physical network, attaching the second header/channel information to the information data, and transmitting the information data to said another physical network.

47. The method of claim 46, wherein the first control message commands a registration of a correspondence between the first header/channel information and the second header/channel information, and

the second control message commands to a receiving node or a network inter-connection node for connecting said another physical network and a third physical network a registration of a correspondence between the second header/channel information and a header/channel information dependent on said third physical network.

48. The method of claim 46, wherein the information data to be transmitted by the step (d) is MPEG data, and the step (e) converts the transmission format of the MPEG data from a transmission format for the MPEG data in said one physical network to a transmission format for the MPEG data in said another physical network.

49. A method of data transmission at a data transmitting node connected with an IEEE 1394 bus, comprising the steps of:
    (a) transmitting a control message in a case of transmitting information data to a receiving node connected with another physical network, the control message including an address information of a data transmission destination, and an isochronous channel number or a register offset indicating an isochronous channel of said IEEE 1394 bus; and
    (b) transmitting the information data in forms of IEEE 1394 packets containing the isochronous channel number or the register offset, onto the isochronous channel.

50. The method of claim 49, wherein the control message commands to a network inter-connection node for connecting said IEEE 1394 bus and a next physical network a registration of a correspondence between the isochronous channel number or the register offset and a header/channel information dependent on the next physical network.

51. The method of claim 49, further comprising the step of:
    (c) receiving digital video and/or digital audio data;
        wherein the step (b) transmits the digital video and/or digital audio data received by the step (c) as the information data, by formatting the digital video and/or

digital audio data into an IEEE 1394 transmission format.

52. A method of data transmission at a network inter-
connection node for connecting at least two physical
networks including an IEEE 1394 bus and transmitting an
information data received from one physical network to
another physical network, comprising the steps of:
   (a) receiving a first control message from said one
physical network, the first control message containing an
address information of a data transmission destination, and
a first header/channel information dependent on said one
physical network;
   (b) transmitting a second control message to said another
physical network when the step (a) receives the first
control message, the second control message containing the
address information and a second header/channel information
dependent on said another physical network which is
obtained from the address information;
   (c) storing a correspondence between the first
header/channel information and the second header/channel
information, at least one of the first header/channel
information and the second header/channel information
including an isochronous channel number or a register
offset indicating an isochronous channel or the IEEE 1394
bus; and
   (d) obtaining the second header/channel information
corresponding to the first header/channel information
according to the correspondence stored by the step (c) when
the information data containing the first header/channel
information is received from said one physical network,
attaching the second header/channel information to the
information data, and transmitting the information data to
said another physical network.

53. The method of claim 52, wherein said another physical

network is an Ethernet or a token ring or a FDDI, and the second header/channel information indicates a MAC address.

54. The method of claim 52, wherein said one physical network is an Ethernet or a token ring or a FDDI, and the first header/channel information indicates a MAC address.

55. The method of claim 52, wherein said another physical network is an ATM network, and the second header/channel information indicates a VPI/VCI.

56. The method of claim 52, wherein said one physical network is an ATM network, and the first header/channel information indicates a VPI/VCI.

57. A method of data transmission at a data transmitting node connected with a network, comprising the steps of:
  (a) transmitting a control message in a case of transmitting information data to a receiving node connected with another network, the control message including a first MAC address information of a data transmission destination, and a second MAC address information to be attached to the information data; and
  (b) transmitting the information data containing the second MAC address information, to the receiving node.

58. The method of claim 57, wherein the control message commands to a network inter-connection node for connecting said network and a next network a registration of a correspondence between the second MAC address information and a header/channel information dependent on the next network.

59. The method of claim 57, further comprising the step of:

(c) receiving digital video and/or digital audio data;

wherein the step (b) transmits the digital video and/or digital audio data received by the step (c) as the information data, by formatting the digital video and/or

5 digital audio data into a transmission format for said network.

60. A method of data transmission at a network interconnection node for transmitting information data received

10 from one network to another network, comprising the steps of:

(a) receiving a first control message from said one network, the first control message containing a first MAC address information of a data transmission destination, and

15 a second MAC address information;

(b) transmitting a second control message to said another network when the step (a) receives the first control message, the second control message containing the first MAC address information, and a third MAC address

20 information which is obtained from the first MAC address information;

(c) storing a correspondence between the second MAC address information and the third MAC address information; and

25 (d) obtaining the third MAC address information corresponding to the second MAC address information according to the correspondence stored by the step (c) when the information data containing the second MAC address information is received from said one network, attaching

30 the third MAC address information to the information data, and transmitting the information data to said another network.

61. A method for connecting at least two physical networks

35 at a network inter-connection node, comprising the steps

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of:

(a) receiving from a first physical network an address
resolution request for resolving a datalink layer address
from a network layer address;

5   (b) forwarding the address resolution request with respect
to a connected physical network other than the first
physical network;

(c) receiving from a second physical network a first
address resolution response corresponding to the address

10   resolution request forwarded by the step (b);

(d) registering a correspondence between the network layer
address and the second physical network into a routing
table, by referring to a network layer source address or a
network addrees contained in the first address resolution

15   response; and

(e) transmitting to the first physical network a second
address resolution response corresponding to the address
resolution request received by the step (a), by inserting a
datalink layer address of said network inter-connection

20   node device as a resolved address.

62.   The method of claim 61, further comprising the steps
of:

(f) transferring a received packet to a physical network

25   registered in the routing table, according to a network
layer destination address of the received packet.

63.   The method of claim 61, wherein the step (e) activates
the step (b) when a network layer address contained in the

30   address resolution request received from the first physical
network is not a network layer address of said network
inter-connection node device and not registered in the
routing table, and transmits the second address resolution
response otherwise.

35

64. The method of claim 61, wherein the first physical network and the second physical network are operated by different datalink protocols.

5 65. A communication device connected with a network of broadcast type, comprising:

a reception unit for receiving a first message which is a control message for bandwidth reservation with respect to a network layer data flow, including a first identifier

10 for identifying the network layer data flow, from a second communication device connected with the network;

an establishing unit for establishing a broadcast type channel on the network according to the first message received by the reception unit; and

15 a transmission unit for transmitting a second message which contains at least a correspondence between a second identifier of the broadcast type channel established by the establishing unit and the first identifier of the network layer data flow, to the second communication device.

20

66. The communication device of claim 65, wherein the first message is a message for requesting bandwidth reservation, which is transmitted from the second communication device connected to a downstream direction of

25 the network layer data flow.

67. The communication device of claim 65, wherein the first message is a message for notifying bandwidth to be used, which is transmitted from the second communication

30 device connected to an upstream direction of the network layer data flow.

68. The communication device of claim 67, further comprising:

35 a second transmission unit for transmitting a message

for requesting bandwidth reservation to the second communication device which is connected to an upstream direction of the network layer data flow.

5   69.   The communication device of claim 65, wherein the transmission unit transmits the second message in a form of writing into a register provided at the second communication device.

10   70.   A communication device connected with a network of broadcast type, comprising:

a register for registering a correspondence between an identifier of a broadcast type channel established on the network which is to be used in transmitting and receiving a

15   network layer data flow and an identifier of the network layer data flow; and

a transmission and/or reception unit for transmitting and/or receiving the network layer data flow through the broadcast type channel according to the correspondence

20   registered in the register.

71.   A communication device connected with a network of broadcast type, comprising:

a reception unit for receiving a subscription request

25   for a network layer multicast address from a second communication device connected with the network;

an establishing unit for establishing a broadcast type channel on the network in response to the subscription request received by the reception unit;

30   a notification unit for notifying at least a correspondence between an identifier of the broadcast type channel established by the establishing unit and the network layer multicast address, to the second communication device; and

35   a transmission unit for transmitting data destined to

the network layer multicast address to the broadcast type channel established by the establishing unit.

72. The communication device of claim 71, further
5 comprising:
    a second reception unit for receiving from the second communication device a request for reservation of bandwidth required in receiving the data destined to the network layer multicast address from the second communication
10 device; and
    a reservation unit for reserving bandwidth of the broadcast type channel established by the establishing unit in response to the request received by the second reception unit.

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73. A communication device, connected with a network of broadcast type, for transmitting data destined to a network layer multicast address, comprising:
    a reservation unit for reserving bandwidth for a
20 broadcast type channel;
    a first transmission unit for transmitting the data destined to the network layer multicast address by using a period or connection for which the bandwidth of the broadcast type channel on the network is not reserved;
25   a second transmission unit for transmitting the data destined to the network layer multicast address by switching the period or connection used in the first transmission unit to a period or connection for which the bandwidth of the broadcast type channel is reserved, when
30 the bandwidth is reserved for the broadcast type channel by the reservation unit.

74. The communication device of claim 73, wherein an identifier of the broadcast type channel to which the data
35 are outputted from the second transmission unit when the

bandwidth is reserved by the reservation unit is identical
to an identifier of the broadcast type channel to which the
data are outputted from the first transmission unit when
the bandwidth is not reserved.

5

75. A method for controlling transfer of data flow at a
communication device connected with a network of broadcast
type, comprising the steps of:

receiving a first message which is a control message
10 for bandwidth reservation with respect to a network layer
data flow, including a first identifier for identifying the
network layer data flow, from a second communication device
connected with the network;

establishing a broadcast type channel on the network
15 according to the first message received by the receiving
step; and

transmitting a second message which contains at least
a correspondence between a second identifier of the
broadcast type channel established by the establishing step
20 and the first identifier of the network layer data flow, to
the second communication device.

76. The method of claim 75, wherein the first message is a
message for requesting bandwidth reservation, which is
25 transmitted from the second communication device connected
to a downstream direction of the network layer data flow.

77. The method of claim 75, wherein the first message is a
message for notifying bandwidth to be used, which is
30 transmitted from the second communication device connected
to an upstream direction of the network layer data flow.

78. The method of claim 77, further comprising the step
of:
35 transmitting a message for requesting bandwidth

reservation to the second communication device which is connected to an upstream direction of the network layer data flow.

5   79.   The method of claim 75, wherein the transmitting step transmits the second message in a form of writing into a register provided at the second communication device.

80.   A method for controlling transfer of data flow at a
10 communication device connected with a network of broadcast type, comprising the steps of:
        registering a correspondence between an identifier of a broadcast type channel established on the network which is to be used in transmitting and receiving a network layer
15 data flow and an identifier of the network layer data flow, in a register provided in the communication device; and
        transmitting and/or receiving the network layer data flow through the broadcast type channel according to the correspondence registered in the register.

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81.   A method for controlling transfer of data flow at a communication device connected with a network of broadcast type, comprising the steps of:
        receiving a subscription request for a network layer
25 multicast address from a second communication device connected with the network;
        establishing a broadcast type channel on the network in response to the subscription request received by the receiving step;
30   notifying at least a correspondence between an identifier of the broadcast type channel established by the establishing step and the network layer multicast address, to the second communication device; and
        transmitting data destined to the network layer
35 multicast address to the broadcast type channel established

by the establishing step.

82.   The communication device of claim 81, further comprising the steps of:

5   receiving from the second communication device a request for reservation of bandwidth required in receiving the data destined to the network layer multicast address from the second communication device; and

        reserving bandwidth of the broadcast type channel
10 established by the establishing step in response to the request for reservation of bandwidth.

83.   A method for controlling transfer of data flow at a communication device, connected with a network of broadcast
15 type, for transmitting data destined to a network layer multicast address, comprising the steps of:

    (a) reserving bandwidth for a broadcast type channel;

    (b) transmitting the data destined to the network layer multicast address by using a period or connection for which
20 the bandwidth of the broadcast type channel on the netowrk is not reserved; and

    (c) transmitting the data destined to the network layer multicast address by switching the period or connection used in the step (b) to a period or connection for which
25 the bandwidth of the broadcast type channel is reserved, when the bandwidth is reserved for the broadcast type channel by the step (a).

84.   The method of claim 83, wherein an identifier of the
30 broadcast type channel to which the data are outputted by the step (c) when the bandwidth is reserved by the step (a) is identical to an identifier of the broadcast type channel to which the data are outputted by the step (b) when the bandwidth is not reserved.

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